

GLOSSARY OF TERMS AND ABBREVIATIONS*

Absolute. A chemical substance relatively free of impurities.

Absorb. To suck up. The penetration of a solid substance by a liquid as by capillary, osmotic, solvent, or chemical action. See Adsorb.

ACGIH. American Conference of Governmental Industrial Hygienists. An organization of professionals in governmental agencies or educational institutions engaged in occupational safety and health programs. ACGIH develops and publishes recommended occupational exposure limits for chemical substances and physical agents (see TLV). (6500 Glenway Avenue, Bldg. D-7, Cincinnati, OH 45211; [513] 661-7881)

Acid. An inorganic or organic compound that (1) reacts with metals to yield hydrogen; (2) reacts with a base to form a salt; (3) dissociates in water to yield hydrogen or hydronium ions; (4) has a pH of less than 7.0; and (5) neutralizes bases or alkaline media. All acids contain hydrogen and turn litmus paper red. They are corrosive to human tissue and are to be handled with care. See Base; pH.

Acidosis. A condition of decreased alkalinity of the blood and tissues marked by sickly sweet breath, headache, nausea, vomiting, and visual disturbances; usually the result of excessive acid production. Tissues and CNS functions are disturbed.

Acrid. Irritating and bitter.

Action Level. The exposure level (the material's concentration in air) at which OSHA regulations to protect employees take effect (29 CFR 1910.1001-1047); e.g., workplace air analysis, employee training, medical monitoring, and record keeping. Exposure at or above the action level is termed occupational exposure. Exposure below this level can also be harmful. This level is generally one half the TLV.

Active Ingredient. The ingredient of a product that actually does what the product is designed to do. The remaining ingredients may be "inert."

** Based on April 1990 version of the *The MSDS Pocket Dictionary*, one of Genium's Pocket Publications. These include: *Right-to-Know Pocket Guide for School & University Employees* - USA law

The WHIMS Pocket Dictionary - Canadian law

Right-to-Know Pocket Guide for Construction Workers - USA law

Right-to-Know Pocket Guide for Laboratory Employees - USA law

The books serve as excellent training aids and promotional handouts. You will find in them this Glossary, plus explanations of the laws, a sample MSDS, and a description of how to read an MSDS. On orders of 100 or more, we can imprint your organization's name, logo and message on the cover. Contact us for ordering information.

Acute Health Effect. An adverse effect on a human or animal body, with symptoms developing rapidly. See Chronic Health Effect.

Acute Lethality. The death of animals immediately or within 14 days after a single dose of or exposure to a toxic substance.

Acute Toxicity. The adverse (acute) effects resulting from a single dose of or exposure to a material. Ordinarily used to denote effects observed in experimental animals.

Adsorb. To collect gas or liquid molecules on the surface of another material. See Absorb.

Aerosol. A fine aerial (in air or other gas) suspension of liquid (mist, fog) or solid (dust, fume, smoke) particles small enough to stay suspended. See Smoke; Fog; Mist.

Agent. Any substance, force, radiation, organism, or influence that affects the body. The effects may be beneficial or injurious.

ALARA. Acronym for as low as reasonably achievable. Used in radiation control.

Alkali. Broadly, any compound having highly basic properties; i.e., one that readily ionizes in aqueous solution to yield OH anions, with a pH above 7, and turns litmus paper blue. Alkalies are oxides and hydroxides of certain metals and belong to group IA of the periodic table (Li, Na, K, Rb, Cs, Fr). Ammonia and amines may also be alkaline. Alkalies are caustic and dissolve human tissue. Treat alkali burns by quickly washing the afflicted area with large amounts of water for at least 15 minutes. Common commercial alkalies are sodium carbonate (soda ash), NaOH, lime, lye, potash, caustic soda, KOH, water glass, regular mortar, portland cement, and bicarbonate of soda. See Acid; Base; pH.

Alopecia. Loss of hair.

ALR. Allergic effects.

Ambient. Usual or surrounding conditions.

Analgesia. Loss of sensitivity to pain.

Anesthesia. Loss of sensation or feeling, CNS depression.

Anhydride. A compound derived from another compound (as an acid) by removing the elements that compose water; i.e., hydrogen and oxygen.

Anhydrous. "Without water." Describes a substance in which no water molecules are present in the form of a hydrate or as water of crystallization.

Anorexia. Loss of appetite.

Anosmia. Loss of the sense of smell.

Anoxia. A lack of oxygen from inspired air (literally, "without oxygen"). See Hypoxia.

ANSI. American National Standards Institute. A privately funded organization that identifies industrial/public national consensus standards and coordinates their development. Many ANSI standards relate to safe design/performance of equipment and safe practices or procedures. (1430 Broadway, New York City, NY 10018; [212] 642-4900)

Antidote. A remedy to relieve, prevent, or counteract the effects of a poison. Eliminating the poison, neutralizing it, or absorbing it are effective.

Anuria. Absence or defective excretion of urine.

Apnea, Apneic. Breathing temporarily stopped.

Appearance. The physical state of a material; e.g., powder, gas, or liquid. If there is a difference between the appearance of the material and that listed on the MSDS, contact your supervisor.

AQTX, Aquatic Toxicity. The adverse effects on marine life that result from exposure to a toxic substance. See TLM.

Aqueous, aq. Describes a water-based solution or suspension. Frequently describes a gaseous compound dissolved in water.

Argyria. Local or generalized grey-blue colored impregnation of the body (skin) tissue with silver.

Article. A manufactured item that is specifically shaped or formed with its function dependent on its shape or design. It does not release or result in exposure to a hazardous material in normal use. Articles are excluded from hazard laws unless they give off dust or fumes.

Asbestosis. Chronic lung disease caused by inhaling airborne asbestos fibers.

Asphyxia. Lack of oxygen and interference with the oxygenation of the blood. Can lead to unconsciousness.

Asphyxiant. A vapor or gas that can cause unconsciousness or death by suffocation (lack of oxygen). Most simple asphyxiants are harmful to the body only when they become so concentrated that they reduce (displace) the available oxygen in the air (normally about 21%) to dangerous levels (18% or lower). Examples of simple asphyxiants are CO₂, N₂, H₂, and He. Chemical asphyxiants like carbon monoxide (CO) reduce the blood's ability to carry oxygen, or like cyanide interfere with the body's utilization of oxygen.

Asphyxiation. A condition that causes asphyxia or suffocation. Asphyxiation is one of the principal potential hazards of working in confined spaces.

Aspiration Hazard. The danger of drawing material into the lungs, leading to an inflammatory response that can be fatal.

Asthma. A disease characterized by recurrent attacks of dyspnea, wheezing, and perhaps coughing caused by

spasmodic contraction of the main airways in the lungs.

ASTM. American Society for Testing and Materials. An organization that devises consensus standards for materials characterization and use. (1916 Race Street, Philadelphia, PA 19103; [215] 299-5400)

Asymptomatic. Neither causing nor exhibiting symptoms.

Ataxia. A loss of muscular coordination.

atm. Atmosphere. Pressure measurement. One atm = 14.7 lbs/in.² The pressure exerted by the air at sea level that supports a column of mercury 760 mm high (about 30 in.), expressed as 760 mm Hg. One torr = 1 mm Hg.

Atrophy. Reduction in size or function of tissue, organs, or the entire body caused by lack of use.

Autoignition Temperature. The minimum temperature at which a substance ignites without application of a flame or spark. Do not heat materials to greater than 80% of this temperature.

BAL. British Anti-Lewisite. A name for the drug dimercaprol, a treatment for toxic inhalations.

Base. Substances that (usually) liberate OH anions when dissolved in water and weaken a strong acid. Bases react with acids to form salts and water. Bases have a pH > 7, turn litmus paper blue, and may be corrosive to human tissue. They are also called alkali and caustic. Examples are lye and DRANO™. See Acid; Alkali; pH.

Baumé, Bé. An arbitrary scale of specific gravities devised by the French chemist Antoine Baumé (c. 1800; pronounced bo-may) that indicate concentration of materials in a solution.

BCM. Blood-clotting mechanism effects.

BEI, Biological Exposure Indexes. Numerical values based on procedures to determine the amount of a material the human body absorbs by measuring the material or its metabolic products in tissue, fluid, or exhaled air. See the ACGIH publication *Documentation of the Threshold Limit Values and Biological Exposure Indices*.

Biodegradable. An organic material's capacity for decomposition as a result of attack by microorganisms. Sewage-treatment routines are based on this property. Phosphates and chlorinated hydrocarbons (DDT) are not biodegradable.

Biological Monitoring. Periodic examination of body substances, such as blood or urine, to determine the extent of hazardous material absorption as opposed to mere exposure.

BLD. Blood effects.

Body Burden. The total toxic material a person has ingested or inhaled from all sources over time. E.g., lead can be inhaled from gasoline engine exhaust and ingested from drinking water channeled through lead-soldered pipes, lead glazes on dishes, or flakes from painted surfaces, as well as from a variety of industrial operations.

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Boiling Point, BP. The temperature at which the vapor pressure of a liquid equals the surrounding atmospheric pressure so that the liquid rapidly becomes a vapor. Flammable materials with low BPs generally present special fire hazards. E.g., butane, BP = 31°F; gasoline, BP = 100°F. For mixtures, a range of temperatures is given.

Bonding. A safety practice where two objects (tanks, cylinders, etc.) are interconnected with clamps and wire. This equalizes the electrical potential between the objects and helps prevent static sparks that can ignite flammable materials. See Grounding.

BP. See Boiling Point.

Bradycardia. A slow heartbeat with pulse rate below 60/min.

British Anti-Lewisite. See BAL.

Bronchitis. Inflammation of the bronchial tubes (main airways) in the lungs.

Btu. British thermal unit. The quantity of heat required to raise the temperature of 1 lb of H₂O from 63°F to 64°F. See Calorie.

Buffer. A substance that reduces the change in hydrogen ion concentration (pH) otherwise produced by adding acids or bases to a solution.

c or ca. Circa, about.

C. Indicates continuous exposure when used with toxicological data; e.g., "LD₅₀ > 5 g/kg, 24 H-C" means continuous exposure for 24 hours. OSHA also uses C to designate ceiling exposure limit. See Ceiling Limit; TLV.

°C. Degrees Celsius (centigrade). Metric temperature scale on which 0 (zero)°C (32°F) equals the freezing point of water. 100°C (212°F) equals the boiling point of water. $F = (C \times 1.8) + 32$. $C = (F - 32) \times 5/9$. See °F.

CAA. Clean Air Act. Public Law PL 91-604, 40 CFR 50-80. EPA has jurisdiction. Effective December 31, 1970, and significantly amended several times. The regulatory vehicle that sets and monitors airborne pollution hazardous to public health or natural resources. The EPA sets national ambient air-quality standards. Enforcement and issuance of discharge permits are carried out by the states and are called state implementation plans.

Calorie. Unit of heat. The amount of heat required to raise 1 g of water 1°C. See Btu.

Cancer, Carcinoma. A malignant tumor or cancer; a new growth made up of cells that tend to grow rapidly, infiltrate other cells, and give rise to metastasis (spreading). Each cancer is believed to originate from a single "transformed" cell that grows (splits) at a fast, abnormally regulated pace, no matter where it occurs in the body. Cancer is the second most common cause of

death in the US. The NTP reports that one- to two-thirds of cancers are associated with our environment.

CAR. Carcinogenic effects.

Carcinogen. A material that either causes cancer in humans, or, because it causes cancer in animals, is considered capable of causing cancer in humans. Findings are based on the feeding of large quantities of a material to test animals or by the application of concentrated solutions to the animals' skin. A material is considered a carcinogen if (1) the International Agency for Research on Cancer (IARC) has evaluated it and found it to be a carcinogen or potential carcinogen; (2) the National Toxicology Program's (NTP) *Annual Report on Carcinogens* lists it as a carcinogen or potential carcinogen; (3) OSHA regulates it as a carcinogen; or (4) one positive study has been published. "Select Carcinogen" is defined in 29 CFR 1910, within OSHA's standard "Occupational Exposures to Hazardous Chemicals in Laboratories," as a substance: a) OSHA regulates as a carcinogen; b) the NTP lists as "Known to be carcinogens;" c) the IARC lists as Group 1, "carcinogenic to humans;" d) the IARC lists as Group 2A or 2B, "reasonably anticipated to be carcinogens," since it causes statistically significant tumor incidence in animals per criteria listed in section 2, paragraph b.

CAS Registration Number, CAS, CAS RN. An assigned number used to identify a material. CAS stands for Chemical Abstracts Service, an organization that indexes information published in *Chemical Abstracts* by the American Chemical Society and that provides index guides by which information about particular substances may be located in the abstracts. Sequentially assigned CAS numbers identify *specific* chemicals. The numbers have no chemical significance. The CAS number is a concise, unique means of material identification. (Chemical Abstracts Service, Division of American Chemical Society, Box 3012, Columbus, OH 43210; [614] 421-3600)

Catalyst. A substance that modifies (slows or quickens) a chemical reaction without being consumed.

Cataract. A loss of transparency in the eye's crystalline lens or its capsule.

Caustic. See Alkali.

CC. Closed cup. Used to test flash points.

cc, cm³. Cubic centimeter.

Ceiling Limit, C. The concentration that should not be exceeded during any part of the working exposure. "An employee's exposure [to a hazardous material] shall at no time exceed the ceiling value" (OSHA). See TLV-Ceiling Limit.

Celsius. See °C.

Centigrade. See °C. Celsius is preferred.

Centimeter, cm. 1/100 meter. A cm = 0.4 in.

Centipoise. A cgs unit of the measure of viscosity equal to 1/100 poise. The viscosity of water at 20°C is almost 1 centipoise.

CERCLA. The Comprehensive Environmental Response, Compensation, and Liability Act. The Superfund Law, Public Law PL 96-510, found at 40 CFR 300. The EPA has jurisdiction. Enacted December 11, 1980, and amended thereafter, CERCLA provides for the identification and the cleanup of the hazardous materials that have been released over the land and into the air, waterways, and groundwater. It covers areas affected by newly released materials and older leaking or abandoned dump sites. Report releases of hazardous materials to the National Response Center, (800) 424-8802. CERCLA established the superfund, a trust fund to help pay for the cleanup of hazardous materials sites. The EPA has authority to collect the cleanup costs from those who release the waste material. Cleanup funds come from fines and penalties, from taxes on chemical/petrochemical feed stocks, and the US Treasury Department. A separate fund collects taxes on active disposal sites to finance their monitoring after they are closed. CERCLA is a result of the serious problems that arose from the release of hazardous materials at the Love Canal area near Niagara Falls, NY, in August 1978.

CFR. *Code of Federal Regulations.* A collection of the regulations established by law. Contact the agency that issued the regulation for details, interpretations, etc. Copies are sold by the Superintendent of Documents, Government Printing Office, Washington, DC 20402; (202) 783-3238.

CFC. Chlorofluorocarbon. Associated with damage to the Earth's ozone layer.

cgs. Metric units of centimeter, gram, and second.

Chelating Agent. A chemical compound capable of forming multiple chemical bonds to a metal ion. Used to treat metal poisoning.

Chemical Cartridge Respirator. A respirator using various chemical substances to purify inhaled air of certain contaminative gases and vapors. Typically effective for concentrations no more than 10 times the TLV for a half facepiece and 100 times the TLV for a full facepiece, provided the contaminant has warning properties (odor or irritation) near the TLV.

Chemical Family. A group of single elements or compounds with a common general name. E.g., acetone, methyl ethyl ketone (MEK), and methyl isobutyl ketone (MIBK) are of the ketone family; acrolein, furfural, and acetaldehyde are of the aldehyde family.

Chemical Formula. Gives the number and kind of atoms that comprise a molecule of a material. The chemical formula of water is H₂O. Each molecule of water is made up of 2 atoms of hydrogen and 1 of oxygen.

Chemical Hygiene Officer. Per 29 CFR 1910; OSHA regulation, "Occupational Exposure to Hazardous

Chemicals in Laboratories." The designated, qualified employee who assists in the development and implementation of the CHP. See CHP.

Chemical Name. The scientific designation of a chemical or a name that clearly identifies the chemical for hazard evaluation purposes.

Chemical Pneumonitis. Inflammation of the lungs caused by accumulation of fluids due to chemical irritation.

Chemical Reactivity. The ability of a material to chemically change. Undesirable and dangerous effects such as heat, explosions, or the production of noxious substances can result.

Chemiluminescence. Emission of light during a noncombustible chemical reaction.

CHEMTREC. *Chemical Transportation Emergency Center.* Established in Washington, DC, by the Chemical Manufacturers Association (CMA) to provide emergency information on materials involved in transportation accidents. Twenty-four-hour number: (800) 424-9300. In Washington, DC, Alaska, and Hawaii call (202) 483-7616.

Chloracne. An acnelike eruption caused by excessive contact with certain compounds.

CHP, Chemical Hygiene Plan. Per 29 CFR 1910, OSHA standard; "Occupational Exposures to Hazardous Chemicals in Laboratories." Effective 5/1/90. A written plan that includes specific work practices, standard operating procedures, equipment, engineering controls, and policies to ensure that employees are protected from hazardous exposure levels to all potentially hazardous chemicals in use in their work area. This OSHA standard provides for training, employee access to information, medical consultations, examinations, hazard identification procedures, respirator use, and record keeping practices. See ¶ E of the Standard.

Chronic Health Effect. An adverse effect on a human or animal body with symptoms that develop slowly over a long period of time or that recur frequently. See Acute Health Effect.

Chronic Toxicity. Adverse (chronic) effects resulting from repeated doses of or exposures to a material over a relatively prolonged period of time. Ordinarily used to denote effects noted in experimental animals.

Closed Cup. See CC.

CNS, Central Nervous System. Indicates effects on the CNS by the material, including headache, tremors, drowsiness, convulsions, hypnosis, anesthesia, nervousness, irritability, narcosis, dizziness, fatigue, lethargy, peripheral neuropathy, memory loss, impaired concentration, sleep disturbance, etc.

CO, Carbon Monoxide. A colorless, odorless, flammable, and very toxic gas produced by the in-

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complete combustion of carbon compounds and as a byproduct of many chemical processes. A chemical asphyxiant, it reduces the blood's ability to carry oxygen. Hemoglobin absorbs CO 200 times more readily than it does oxygen.

CO₂, Carbon Dioxide. A heavy, colorless gas produced by the combustion and decomposition of organic substances and as a byproduct of many chemical processes. CO₂ does not burn and is relatively nontoxic and unreactive. High concentrations, especially in confined places, can create hazardous oxygen-deficient environments that can cause asphyxiation. CO₂ is 1.5 times as heavy as air, making it useful as a fire-extinguishing agent to block oxygen and smother a fire.

Code of Federal Regulations. See CFR.

Coefficient of Water/Oil Distribution. Also called the partition coefficient, it is the ratio of the solubility of a chemical in water to its solubility in oil. Used to indicate how easily the human body can absorb or store a material.

Combustible. A term the NFPA, DOT, and others use to classify certain materials with low flashpoints that ignite easily. Both NFPA and DOT generally define *combustible liquids* as having a flash point of 100°F (38°C) or higher. Nonliquid materials such as wood and paper are classified as *ordinary combustibles* by the NFPA. OSHA defines *combustible liquid* within the Hazard Communication Law as any liquid having a flash point at or above 100°F (38°C) but below 200°F (93.3°C). See Flammable.

Common Name. A designation for a material other than its chemical name, such as code name or code number or trade, brand, or generic name. Also, the "product identifier" in Canadian law.

Compressed Gas. Any material contained under pressure, i.e., dissolved gas or liquefied by compression or refrigeration.

conc. Concentration.

Conjunctivitis. Inflammation of the conjunctiva, the delicate membrane that lines the eyelid and covers the eyeball.

Consumer Products Safety Commission. See CPSC.

COR. Corrosive effects.

Cornea. The transparent structure of the external layer of the eyeball.

Corrosion Rate. Expressed in inches of steel per year, accompanied by temperature.

Corrosive. A chemical that causes visible destruction of or irreversible alterations in living tissue by chemical action at the site of contact; a liquid that causes a severe corrosion rate in steel. A waste that exhibits a "characteristic of corrosivity (40 CFR 261.22)," as

defined by RCRA, may be regulated by EPA as a hazardous waste.

CPS. See Centipoise.

CPSC. Consumer Products Safety Commission. A Federal agency responsible for regulating hazardous materials when they are used in consumer goods per the Hazardous Substances Act and Poison Prevention Packaging Act of 1970.

Critical Pressure/Critical Temperature. A temperature above which a gas cannot be liquefied by pressure. The critical pressure is that pressure required to liquefy a gas at its critical temperature.

Cryogenic. Relating to extremely low temperature as for refrigerated gases.

cu m, m³. Cubic meter. m³ is preferred.

CUM. Cumulative effects.

Cutaneous. Pertaining to the skin.

CVS. Cardiovascular effects.

CWA. Clean Water Act. Public Law PL 92-500. Found at 40 CFR 100-140 and 400-470. Effective November 18, 1972, and amended significantly since then. EPA and Army Corps of Engineers have jurisdiction. CWA regulates the discharge of nontoxic and toxic pollutants into surface waters. Its ultimate goal is to eliminate all discharges into surface waters. Its interim goal is to make surface waters usable for fishing, swimming, etc. EPA sets guidelines, and states issue permits (NPDES, Natural Pollutant Discharge Elimination System permit) specifying the types of control equipment and discharges for each facility.

Cyanosis, Cyanotic. A dark blue to purplish coloration of the skin and the mucous membrane caused by lack of oxygen utilization by the body.

Dangerously Reactive Material. A material that can react by itself (e.g., polymerize) or with air or water to produce a hazardous condition. Preventive measures can be taken if you know what conditions may cause the dangerous reaction.

Dec, Decomp. Decompose, Decomposition. Breakdown of a material (by heat, chemical reaction, electrolysis, decay, or other processes) into parts, elements, or simpler compounds.

Deliquescent. A term used to characterize water-soluble salts (usually powdered) that tend to absorb moisture from the air and to soften or dissolve as a result. See Hygroscopic; Hydrophilic.

Demulcent. A material capable of soothing or protecting inflamed, irritated mucous membranes.

Density. Ratio of weight (mass) to volume of a material, usually in grams per cubic centimeter or pounds per gallon. One cc of H₂O weighs 1 g. See Specific Gravity.

Dermal. Used on or applied to the skin.

Dermal Toxicity. Adverse effects resulting from the skin's exposure to a material. Ordinarily used to denote effects on experimental animals.

Dermatitis. Inflammation of the skin.

Designated area. An area of (or device within) a lab to be used for work with "select carcinogens", reproductive toxins, and other materials which have a high degree of acute toxicity. An engineering control intended to minimize the potential for employee exposure to hazardous chemicals.

Diaphoresis. Perspiration, especially profuse.

Dilution Ventilation. See General Ventilation.

DOT. US Department of Transportation. Regulates transportation of materials to protect the public as well as fire, law, and other emergency-response personnel. DOT classifications specify appropriate warnings, such as Oxidizing Agent or Flammable Liquid, that must be used. (400 7th Street, SW, Washington, DC 20590)

DOT Identification Numbers. Four-digit numbers [preceded by UN (United Nations) or NA (North America)] used to identify particular materials for regulation of their transportation. See DOT publications that describe the regulations (49 CFR 172.102). These numbers are called product identification numbers (PINs) under the Canadian Transportation of Dangerous Goods Regulation.

Dust. Solid particles suspended in air produced by some mechanical process such as crushing, grinding, abrading, or blasting. Dusts may be inhalation, fire, or dust-explosion hazards.

Dyspnea. A sense of difficulty in breathing; shortness of breath.

Dysuria. Difficult or painful urination.

EC₅₀. (Median) effective concentration. The concentration of a material in water, a single dose of which is expected to cause a biological effect on 50% of a group of test animals.

Edema. An abnormal accumulation of clear, watery fluid in body tissue.

Electrolyte. A nonmetallic substance that conducts an electric current in solution by the movement of ions rather than electrons.

Embolism. Obstruction of a blood vessel by a transported clot, a mass of bacteria, etc.

Embryo. An organism in the early stages of development before birth. In humans, the developing child is considered an embryo from conception to the end of the second month of pregnancy.

Embryotoxin. A material harmful to a developing embryo at a concentration that has no adverse effect on the pregnant female.

Emetic. An agent that induces vomiting.

Emphysema. An irreversibly diseased lung condition in which the alveolar walls have lost their resiliency, resulting in an excessive reduction in the lungs' capacity.

Endothermic. Process that absorbs heat.

Engineering Controls. Engineering control systems reduce potential hazards by isolating the worker from the hazard or by removing the hazard from the work environment. Methods include ventilation, isolation, and enclosure. This is preferred over personal protective equipment.

EP. Extreme pressure.

EPA, (Canada) Environmental Protection Act. Federal legislation, administered by Environment Canada, designed to protect the environment.

EPA, (US) Environmental Protection Agency. A Federal agency with environmental protection regulatory and enforcement authority. Administers the CAA, CWA, RCRA, TSCA, and other Federal environmental laws. (400 M Street, SW, Washington, DC 20460; [202] 382-2090)

Epidemiology. The study of disease in a general population. Determination of the incidence (rate of occurrence) and distribution of a particular disease (by age, sex, or occupation) may provide information about the causes of the disease.

Epiphora. Excessive flow of tears.

Epistaxis. Nosebleed.

Ergonomics. The study of human characteristics for the appropriate design of living and work environments.

Erythema. Abnormally red skin from capillary congestion.

Etiology. All of the factors that contribute to the cause of a disease or an abnormal condition.

Evaporation Rate. The rate at which a material vaporizes (volatilizes, evaporates) from the liquid or solid state when compared to a known material's vaporization rate. The evaporation rate can be useful in evaluating a material's health and fire hazards. The known material is usually normal butyl acetate (N-BuAc or n-BuAc), with a vaporization rate designated as 1.0. Vaporization rates of other solvents or materials are then classified as (1) FAST evaporating if greater than 3.0, e.g., methyl ethyl ketone (MEK), 3.8; acetone, 5.6; hexane, 8.3; (2) MEDIUM evaporating if 0.8 to 3.0, e.g., 190-proof (95%) ethyl alcohol, 1.4; VM&P naphtha, 1.4; MIBK, 1.6; (3) SLOW evaporating if less than 0.8, e.g., xylene, 0.6; isobutyl alcohol, 0.6; normal butyl alcohol, 0.4; water, 0.3; mineral spirits, 0.1.

Explosive. A material that produces a sudden, almost instantaneous release of pressure, gas, and heat when subjected to abrupt shock, pressure, or high temperature.

Explosive Limits. See Flammable Limits.

Exposure Limits. The concentration in workplace air of a chemical *thought* acceptable. This means that most workers can be exposed at the given levels or lower without harmful effects. The exposure limits in common use are (1) TLV-TWA (threshold limit value - time-weighted average); (2) STEL (short-term exposure limit) or STEV (short-term exposure value); (3) C (ceiling value).

Exothermic. Process that gives off heat.

Extinguishing Media, Agents. The type of fire extinguisher or extinguishing method appropriate for a specific material. Some chemicals react violently in the presence of water, so other methods such as the use of foam or CO₂ should be followed.

°F or F. Degrees Fahrenheit. See °C.

f/cc. Fibers per cubic centimeter of air.

Fasciculation. Muscular twitching.

Fiber. A basic form of matter, usually crystalline, with a high ratio of length to diameter. Examples: animal (wool); vegetable (cotton); mineral (asbestos, steel); and synthetic (rayon, carbon, high polymers).

Federal Register. See FR.

Fibrosis. The formation of fibrous tissue, in a response to inhaled material, in excess of amounts normally present in the lung-tissue walls. This reduces the oxygen and CO₂ exchange efficiency and lung capacity.

Fines. Finely crushed or powdered material or fibers; especially those smaller than the average in a mix of various sizes.

Fire Diamond (NFPA Hazard Rating). Per "NFPA 704" publication. Visual system that provides a general idea of the inherent hazards, and their severity, of materials relating to *fire* prevention, exposure and control. Preferred reading order: Health, Flammability, Reactivity, Special.

Position A - Health Hazard (Blue). Degree of hazard; level of short-term protection.

0 = Ordinary Combustible Hazards in a Fire

1 = Slightly Hazardous

2 = Hazardous

3 = Extreme Danger

4 = Deadly



Position B - Flammability (Red). Susceptibility to burning.

0 = Will Not Burn

1 = Will Ignite if Preheated

2 = Will Ignite if Moderately Heated

3 = Will Ignite at Most Ambient Conditions

4 = Burns Readily at Ambient Conditions

Position C - Reactivity, Instability (Yellow). Energy released if burned, decomposed, or mixed.

0 = Stable and Not Reactive with Water

1 = Unstable if Heated

2 = Violent Chemical Change

3 = Shock and Heat May Detonate

4 = May Detonate

Position D - Special Hazard (White).

Position E - If two specific hazards exist.

OXY = Oxidizer

ACID = Acid

ALKALI = Alkali

COR = Corrosive

W = Use No Water, reacts!



= Radiation Hazard

Fire Point. The lowest temperature at which a liquid produces sufficient vapor to flash near its surface and continues to burn. Usually 10 to 30°C higher than the flash point.

Flammable. Describes any solid, liquid, vapor, or gas that ignites easily and burns rapidly. See Combustible.

Flammable Aerosol. A product is considered a flammable aerosol if it is packaged in an aerosol container and can release a flammable material.

Flammable Gas. A gas that at ambient temperature and pressure forms a flammable mixture with air at a concentration of 13% by volume or less; or a gas that at ambient temperature and pressure forms a range of flammable mixtures with air greater than 12% by volume, regardless of the lower limit.

Flammable Limits (Flammability Limits, Explosive Limits). The minimum and maximum concentrations of a flammable gas or vapor between which ignition can occur. Concentrations below the lower flammable limit (LFL) are too lean to burn, while concentrations above the upper flammable limit (UFL) are too rich. All concentrations between LFL and UFL are in the flammable range, and special precautions are needed to prevent ignition or explosion.

Flammable Liquid. A liquid that gives off vapors readily ignitable at room temperature. Defined by the NFPA and DOT as a liquid with a flash point below 100°F (38°C).

Flammable Solid. A solid that ignites readily and continues to burn or is liable to cause fires under ordinary conditions or during transportation through friction or retained heat from manufacturing or processing and that burns so vigorously and persistently as to create a serious transportation hazard. See Combustible.

Flash Back. Occurs when a distant spark or ignition source ignites a trail of flammable material. The flame then travels along the trail of the material back to its source.

Flash Point, FP. The lowest temperature at which a flammable liquid gives off sufficient vapor to form an ignitable mixture with air near its surface or within a vessel. Combustion does not continue. FP is determined by tests in cups. See Fire Point.

Foam. Fire-fighting material consisting of small bubbles of air, water, and concentrating agents. Chemically, the air in the bubbles is suspended in the fluid. The foam clings to vertical and horizontal surfaces and flows freely over burning materials. Foam puts out a fire by blanketing it, excluding air, and blocking the escape of volatile vapor. Its flowing properties resist mechanical interruption and reseal the burning material.

Fog. A visible suspension of fine droplets in a gas; e.g., water in air.

Formula Weight. See Molecular Weight.

FP. See Flash Point.

FR. The *Federal Register*. A daily publication that lists and discusses Federal regulations. Available from the Government Printing Office.

Freezing Point. The temperature at which a material changes its physical state from liquid to solid. This information is important because a frozen material may burst its container or the hazards could change.

Fugitive Emission. Gas, liquid, solid, vapor, fume, mist, fog, or dust that escapes from process equipment or a product.

"Full Protective Clothing." Fully protective gear that prevents skin contact with, inhalation of, or ingestion of gases, vapor, liquids, and solids (dusts, etc.) Includes SCBA (self-contained breathing apparatus).

Fume. An airborne dispersion consisting of minute solid particles arising from the heating of a solid (such as molten metal, welding). This heating is often accompanied by a chemical reaction where the particles react with oxygen to form an oxide.

g or gm. Gram. Metric unit of weight.

Gangrene. Death of tissue leading to its rotting.

Gas. A formless fluid that occupies the space of its enclosure. It can settle to the bottom or top of an enclosure when mixed with other materials. It can be changed to its liquid or solid state only by increased pressure and decreased temperature.

Gastric Lavage. Washing out of the stomach using a tube and fluids. Pumping the stomach.

Gastroenteritis. Inflammation of the stomach and intestine.

Gastrointestinal Tract. The stomach and intestine as a functional unit. Also GI tract.

Gavage. Feeding by means of a stomach tube.

General Ventilation. Also known as dilution ventilation. The removal of contaminated air and its replacement with clean air from the general workplace area as opposed to local ventilation, which is specific air

changing in the immediate air of a contamination source. An example of local ventilation is a laboratory fume hood.

Generic Name. A designation or identification such as code name, code number, trade name, or brand name used to identify a chemical by other than its chemical name.

GI, GIT. See Gastrointestinal Tract.

Gingivitis. Inflammation of the gums.

GRAS. Generally recognized as safe. A phrase applied to food additives approved by the FDA.

Grounding. A safety practice to conduct any electrical charge to the ground, preventing sparks that could ignite a flammable material. See Bonding.

hr(s). Hour(s).

Hazard Communication Rule. See OSH Act. Requires chemical manufacturers and importers to assess the hazards associated with the materials in their workplace (29 CFR 1910.1200). Material safety data sheets, labeling, and training are all results of this law. You are urged to acquire and become familiar with these regulations. Contact your local OSHA office.

Hazardous Decomposition. A breaking down or separation of a substance into its constituent parts, elements, or into simpler compounds accompanied by the release of heat, gas, or hazardous materials.

Hazardous Decomposition Products. Some materials give off hazardous materials when they decompose or burn.

Hazardous Chemical, Material. In a broad sense, any substance or mixture of substances having properties capable of producing adverse effects on the health or safety of a human. In 1971 OSHA adopted the following definition in regulations affecting employers in operations subject to the Federal Longshoremen's and Harbor Worker's Compensation Act. "The term *Hazardous Material* means a material which has one or more of the following characteristics: (1) Has a flash point below 140°F, closed cup, or is subject to spontaneous heating; (2) Has a threshold limit value below 500 ppm for gases and vapors, below 500 mg/m³ for fumes, and below 25 mppcf (million particles per cubic foot) for dusts; (3) Has a single dose oral LD₅₀ below 50 mg/kg; (4) Is subject to polymerization with the release of large amounts of energy; (5) Is a strong oxidizing or reducing agent; (6) Causes first degree burns to skin [from a] short time exposure, or is systemically toxic by skin contact; or (7) In the course of normal operations, may produce dusts, gases, fumes, vapors, mists, or smokes which have one or more of the above characteristics." Also included are substances that are carcinogens, toxic, irritants, corrosives, sensitizers, and agents which damage the lungs, skin, eyes, or mucous membranes.

Hazardous Waste Number. An identification number assigned by the EPA, per the RCRA Law, to

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identify and track wastes. (40 CFR 261.33, 40 CFR 302.4)

Hematuria. Blood in the urine.

Hemolysis, Hemolytic. Separation of the hemoglobin from red blood corpuscles.

HEPA. High-efficiency particulate air filter. Also called "absolute." Has a 99.97% removal efficiency for .03-micron particles.

Hepatic. Pertaining to the liver.

HMIS. The hazardous materials identification system, developed by NPCA to provide information on the acute health hazards, reactivity, and flammability encountered in the workplace at room temperatures. A number is assigned to a material indicating the degree of hazard, from 0 for the least up to 4 for the most severe. Letters designate personal protective equipment. (Details available from Labelmaster, 5724 N Pulaski Rd, Chicago, IL 60646; [312] 478-0900.) See NPCA and pages 19-20.

Hydrophilic. Describing materials having large molecules that tend to absorb and retain water, causing them to swell and frequently to become gels. See Deliquescent.

Hygroscopic. Readily adsorbing available moisture in any form. See Deliquescent.

Hyperemia. Congestion of blood in a body part.

Hypergolic. Self-igniting upon contact of its components without a spark or external aid; especially rocket fuel or a propellant that consists of combinations of fuels and oxidizers.

Hypocalcemia. Calcium deficiency of the blood.

Hypoxia. Insufficient oxygen, especially applied to body cells. See Anoxia.

I. Intermittent.

IARC. International Agency for Research on Cancer. One of the three sources that OSHA refers to for data on a material's carcinogenicity. (World Health Organization, Geneva, Switzerland; distributed in the USA from 49 Sheridan Avenue, Albany, NY 12210 [518] 436-9686)

IDLH. Immediately dangerous to life and health. Used to determine selection of a respirator. The maximum concentration from which one could escape within 30 minutes without any escape-impairing symptoms or irreversible health effects. Also, IDLH conditions and conditions that would lead to an IDLH exposure.

Ignition Temperature. The lowest temperature at which a combustible material ignites in air and continues to burn independently of the source of heat.

IMDG Code, IMO Classification. The IMDG (International Maritime Dangerous Goods) Code assigns divisions, classes, and codes to materials in shipment. These are explosives, flammables, oxidizers, poisons, corrosives, and other regulated substances. The code also assigns labeling and the DOT UN/NA and PINs.

(International Maritime Organization, #4 Albert Embankment, London, SE 175R, United Kingdom)

Impervious. Describes a material that does not allow another substance to penetrate or pass through it.

Incompatible. Describes materials that could cause dangerous reactions and the release of energy from direct contact with one another.

Inert Ingredients. Anything other than the active ingredient in a product; not having active properties. Inert ingredients may be hazardous. For example, the propellant gas in aerosol spray can products such as hair spray is flammable.

Inflammable. Capable of being easily set on fire and continuing to burn, especially violently.

Inflammation. A series of reactions produced in tissue by an irritant, injury, or infection. An influx of blood and fluids causes redness and swelling.

Ingestion. The taking in of a substance through the mouth for digestion.

Inhalation, inh. The breathing in of a substance in the form of a gas, vapor, fume, mist, or dust.

Inhibitor. A material added to another to prevent an unwanted reaction; e.g., polymerization.

Inorganic Materials. Compounds derived from other than vegetable or animal sources that do not generally contain carbon atoms. Some simple carbon compounds are considered inorganic (i.e., carbides, CO_x, carbonates, CS₂).

Insol. Insoluble.

Interstitial Fibrosis. Scarring of the lungs.

IRDS. Primary irritation dose.

Iridocyclitis. Inflammation of both the eye's iris and its ciliary body.

IRR. Irritant effects. Any irritant effect on the skin, eye, or mucous membrane.

Irritant. A noncorrosive material that causes a reversible inflammatory effect on living tissue by chemical action at the site of contact as a function of concentration or duration of exposure.

Isomers. Chemical compounds with the same molecular weight and atomic composition but differing molecular structure; e.g., *n*-pentane and 2-methylbutane.

Jaundice. Yellowish discoloration of tissue (skin), whites of eyes (sclerae), and bodily fluids with bile pigment (bilirubin) caused by any of several pathological conditions that interrupt the liver's normal production and discharge of bile.

Ketosis. The condition marked by excessive production or accumulation of ketone bodies in the body caused by disturbed carbohydrate metabolism.

kg, kilogram. 1,000 grams.

l. Liter. Equal to 1.057 quarts.

Label. Any written, printed, or graphic sign or symbol displayed on or affixed to containers of hazardous chemicals. A label should identify the hazardous material, appropriate hazard warnings, and name and address of the chemical manufacturer, importer, or other responsible party.

Laboratory. Per 29 CFR 1910. A facility where the "laboratory use of hazardous chemicals" occurs, where relatively small quantities of hazardous chemicals are used on a non-production basis.

Laboratory Scale (activity). The work involves containers of substances used for reactions and transfers that are designed for easy and safe handling by one person. Workplaces that produce commercial quantities of materials are excluded from the definition of "Laboratory."

Laboratory-type Hood. Lab device enclosed on five sides with a moveable sash or fixed access port on the sixth side. In operation it draws and then exhausts air from the lab to prevent or minimize the escape of air contaminants. It enables materials to be manipulated within the hood by the employee's hands and arms only. Walk-in hoods are permitted if airflow and exhaust remove contaminants and the employee is not within the enclosure when contaminants are released.

Laboratory use. Of hazardous chemicals is when *all* of the following conditions are met:
a) Chemical manipulations are carried out on a "laboratory scale." b) Multiple chemical procedures or chemicals are used. c) The procedures are neither part of nor simulate a production process. d) Protective lab practices and equipment are available and in common use to minimize the potential for employee exposure to hazardous chemicals.

Lacrimation. Secretion and discharge of tears.

Lacrimator. A material that produces tears.

Landfill. Disposal of trash and waste products at a controlled location that is then sealed and buried under earth. Increasingly seen as a less than satisfactory disposal method because of the long-term environmental impact of waste materials in the ground.

Latency Period. The time that elapses between exposure and the first manifestations of disease or illness. Latency periods can range from minutes to decades, depending on the hazardous material.

Lavage. A washing of a hollow organ, such as the stomach, using a tube and fluids.

LC50. Lethal concentration 50, median lethal concentration. The concentration of a material in air that on the basis of laboratory tests (respiratory route) is expected to kill 50% of a group of test animals when administered as a single exposure in a specific time period, usually 1 hour. The LC50 is expressed as parts of material per million parts of air, by volume (ppm) for gases and vapors, as micrograms of material per liter of air ($\mu\text{g/L}$), or milligrams of material per cubic meter of

air (mg/m^3) for dusts and mists, as well as for gases and vapors.

LC_{Lo}. Lethal concentration low. The lowest concentration of a substance in air reported to have caused death in humans or animals. The reported concentrations may be entered for periods of exposure that are less than 24 hours (acute) or greater than 24 hours (subacute and chronic).

LD50. Lethal dose 50. The single dose of a substance that causes the death of 50% of an animal population from exposure to the substance by any route other than inhalation. Other lethal-dose percentages, such as LD₁, LD₁₀, LD₃₀, and LD₉₉, may be in the scientific literature. LD50 is usually expressed as milligrams or grams of material per kilogram of animal weight (mg/kg or g/kg , where $50 \text{ g} = 1 \text{ teaspoonful}$).

LD_{Lo}. Lethal dose low. The lowest dose of a substance introduced by any route, other than inhalation, reported to have caused death in humans or animals.

LEL. See Lower Explosive Limit, Lower Flammable Limit.

Lesion. An abnormal change, injury, or damage to tissue or to an organ.

Lethargy. Sluggish feeling.

Leukemia. A progressive, malignant disease of the blood-forming organs.

LFL. See Lower Explosive Limit, Lower Flammable Limit.

LFM or lfm. Linear feet per minute.

Limits of Flammability. See Flammable Limits.

Lipid Granuloma. A mass of chronically inflamed tissue that is usually infective.

Lipid Pneumonia. A chronic condition caused by aspiration of oily substances into the lungs.

Local Ventilation. The drawing off and replacement of contaminated air directly from its source. This type of ventilation is recommended for hazardous airborne materials.

Lower Explosive Limit, Lower Flammable Limit. Refers to the lowest concentration of gas or vapor (% by volume in air) that burns or explodes if an ignition source is present at ambient temperatures. The LEL is constant up to 250°F. Decrease it by 0.7 at temperatures above 250°F because explosibility increases with higher temperature. See Flammable Limits.

m. Meter. Metric unit of length equal to 39.37 in.

m³ or cu m. Cubic meter, m³ is preferred.

Malaise. A feeling of general discomfort, distress, or uneasiness; an out-of-sorts feeling.

Material Safety Data Sheet. See MSDS.

Melting Point. The temperature at which a solid changes to a liquid.

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Metabolism. The chemical and physical processes whereby the body functions.

Metastasis. The transmission of a disease from one part of the body to another.

Meter (m). A measure of length; 100 cm; the equivalent of 39.371 in.

Methemoglobinemia: The presence of methemoglobin in the bloodstream caused by the reaction of materials with the hemoglobin in red blood cells that reduces their oxygen-carrying capacity. Methemoglobin is a soluble, brown, crystalline blood pigment that differs from hemoglobin in that it contains ferric iron and is unable to combine reversibly with molecular oxygen.

mg. Milligram ($1/1000$, 10^{-3} , of a gram).

mg/kg. Milligrams per kilogram. Dosage used in toxicology testing to indicate a dose administered per kg of body weight ($50 \text{ mg} = 1 \text{ teaspoonful}$).

mg/m³. Milligrams per cubic meter of air. $\text{mg/m}^3 = \text{ppm} \times \text{MW} \div 24.45$.

Microgram (μg). One one-millionth of a gram.

Micrometer (μm). One one-millionth of a meter; occasionally referred to as a micron.

Millimeter (mm). $1/1,000$ of a meter.

min. Minute.

Mine Safety and Health Administration. See MSHA.

Miscible. Describes liquids that can be mixed in any ratio.

Mist. Suspended liquid droplets in the air generated by condensation from the gaseous to the liquid state or by mechanically breaking up a liquid by splashing or atomizing.

Mixture. A heterogeneous association of materials that cannot be represented by a chemical formula and that does not undergo chemical change as a result of interaction amongst the mixed materials. The constituent materials may or may not be uniformly dispersed and can usually be separated by mechanical means (as opposed to a chemical reaction). Uniform liquid mixtures are called solutions. "If a hazardous chemical is present in the mixture in reportable quantities (i.e., 0.1% for carcinogens and 1.0% for other health hazards), it must be reported unless the mixture has been tested as a whole" (OSHA CPL 23-0238A).

ml. Milliliter. A metric unit of capacity equal to 1 cubic centimeter or about $1/16 \text{ in}^3$.

MLD. Mild irritation effects.

mm Hg. A measure of pressure in millimeters of a mercury column above a reservoir. See atm.

MMI. Mucous membrane effects.

MOD. Moderate irritation effects.

Mole. The quantity of a chemical substance that has a weight in a unit (usually grams) numerically equal to the molecular weight. For example, NaCl has a formula weight of 58.5 (Na, 23, and Chlorine, 35.5). One mole of NaCl is 58.5 g.

Molecular Weight. The mass in grams per mole of a substance. See Mole.

mppcf. Millions of particles per cubic foot of air, based on impinger samples counted by light-field techniques (OSHA).

MSDS. Material safety data sheet. OSHA has established guidelines for the descriptive data that should be concisely provided on a data sheet to serve as the basis for written hazard-communication programs. The thrust of the law is to have those who make, distribute, and use hazardous materials be responsible for effective communication. See the Hazard Communication Rule, 29 CFR, Part 1910. 1200, as amended, Section g. See Schedule I, Section 12, of the Canadian Hazardous Products Act. See the front of this book.

MSHA. Mine Safety and Health Administration. A Federal agency within the US Department of Labor that devises and promulgates mandatory safety and health rules for mines.

MSK. Muscular-skeletal effects.

Mucous Membrane. The mucous-secreting membrane lining the hollow organs of the body; i.e., nose, mouth, stomach, intestine, bronchial tubes, and urinary tract.

MUT, Mutagen. A material that induces genetic changes (mutations) in the DNA of chromosomes. Chromosomes are the "blueprints" of life within individual cells.

MW. See Molecular Weight.

n-. Normal. A chemical name prefix signifying a straight-chain structure; i.e., no branches.

NA, ND. Not applicable, not available; not determined.

NA Number. See DOT Identification Numbers.

Narcosis. Stupor or unconsciousness often produced by exposure to organic chemicals.

National Fire Protection Association. See NFPA.

National Toxicology Program. See NTP.

Nausea. A tendency to vomit; a feeling of sickness in the stomach.

NCI. National Cancer Institute. A part of the National Institutes of Health that studies cancer.

Necrosis. Localized death of tissue.

NEO. Neoplastic effects; production of tumors.

Neoplasm. A new or abnormal tissue growth that is uncontrollable and progressive.

Nephrotoxic. Poisonous to the kidney.

Neuritis. Inflammation of the nerves.

Neutralize. To render chemically harmless; to return the pH to the neutral level of 7 by adding acid (base) to a basic (acidic) compound.

NFPA. National Fire Protection Association. An international voluntary membership organization to promote/improve fire protection and prevention and establish safeguards against loss of life and property by fire. Best known for the *National Fire Codes*, 16 volumes of standards, recommended practices, and manuals developed (and periodically updated) by NFPA committees. NFPA 704M publication is the code for showing hazards of materials using the familiar diamond-shaped label with appropriate numbers or symbols (NFPA hazard rating). See *Fire Diamond*. (Batterymarch Park, Quincy, MA 02269; (800) 344-3555, [617] 770-3000)

NFPA Hazard Rating. See Fire Diamond.

ng. Nanogram. One billionth, 10^{-9} , of a gram.

NIOSH. National Institute of Occupational Safety and Health. The agency of the Public Health Service that tests and certifies respiratory and air-sampling devices. It recommends exposure limits to OSHA for substances, investigates incidents, and researches occupational safety.

NOC. Not otherwise classified.

NOEL. No effect level.

N inflammable. Incapable of being easily ignited or burning with extreme rapidity when lighted. Also, a DOT hazard class for any compressed gas other than a flammable one.

NOS. Not otherwise specified.

NO_x. Oxides of nitrogen (NO, NO₂, and N₂O₄). They react with the moisture in the respiratory tract to produce acids that corrode and irritate tissue, causing congestion and pulmonary edema. Symptoms of acute exposure can develop over 6 to 24 hours. Chronic exposure to low levels can cause irritation, cough, headache, and tooth corrosion. Exposure to 5 to 50 ppm of NO₂ can cause slowly evolving pulmonary edema.

NPCA. National Paint and Coatings Association. The trade association of manufacturers that developed the HMIS labeling system. (1500 Rhode Island Avenue, NW, Washington, DC 20005; [202] 462-6272) See HMIS.

NTP. National Toxicology Program. Federal activity overseen by the Department of Health and Human Services with resources from National Institutes of Health, the Food and Drug Administration, and the Center for Disease Control. Its goals are to develop tests useful for public health regulations of toxic chemicals, to develop toxicological profiles of materials, to foster testing of materials, and to communicate the results for use by others. (NTP Information Office, MD B2-04, Box 12233, Research Triangle Park, NC 27709)

Nuisance Particulates. Dusts that do not produce significant organic disease or toxic effect from "reasonable" concentrations and exposures. TLV of 10 mg/m³ or 30 mppcf.

Nystagmus. Spastic, involuntary motion of the eyeballs.

Occupational Exposure. See Action Level.

Occupational Safety and Health Act. See OSH Act.

Occupational Safety and Health Administration. See OSHA.

Odor Threshold. The lowest concentration of a material's vapor (or a gas) in air that is detectable by odor.

OEL. Occupational Exposure Limit. See Exposure Limits.

Oliguria. Scanty or low volume of urine.

Opaque. Impervious to light rays.

Organic Materials. Compounds composed of carbon, hydrogen, and other elements with chain or ring structures.

Organic Peroxide. A compound containing the bivalent - O - O - structure and which is a structural derivative of hydrogen peroxide (H₂O₂) where one or both hydrogen atoms has been replaced by an organic radical.

ORM. Other regulated material. DOT hazard classification of a particular hazardous material to label it in transport. ORM-A: materials with an anesthetic, irritating, noxious, toxic, or other property whose leakage can cause extreme discomfort to transportation personnel. ORM-B: materials (including solids wet with water) that can cause damage to a vehicle if they leak. ORM-E: materials that are not in any other hazard classification but are subject to DOT regulations.

OSHA. The Occupational Safety and Health Administration. Part of the US Department of Labor. The regulatory and enforcement agency for safety and health in most US industrial sectors. (Documents are available from the OSHA Technical Data Center Docket Office, Rm N-3670, 200 Constitution Ave, NW, Washington, DC 20210; [202] 523-7894.)

OSH Act. The Occupational Safety and Health Act of 1970. Effective April 28, 1971. Public Law 91-596. Found at 29 CFR 1910, 1915, 1918, 1926. OSHA jurisdiction. The regulatory vehicle to ensure the safety and health of workers in firms larger than 10 employees. Its goal is to set standards of safety that prevent injury and illness among the workers. Regulating employee exposure and informing employees of the dangers of materials are key factors. This act established the Hazard Communication Rule (29 CFR 1910.1200). See Hazard Communication Rule for details.

OSHA Flammable/Combustible Liquid Classification. (29 CFR 1910.106) Flammable/

combustible liquid is a standard classification used to identify the risks of fire or explosion associated with a liquid. Class I Flammable Liquids (with a flash point below 100°F [38°C]) are divided into the following: class IA—flash point below 73°F (22.8°C), boiling point below 100°F (38°C); class IB—flash point below 73°F (22.8°C), boiling point at or above 100°F (38°C); and class IC—flash point at or above 73°F (22.8°C), boiling point below 100°F (38°C). Combustible liquids (with a flash point at or above 100°F) are divided into two classes: class II, with flash point at or above 100°F (38°C) and below 140°F (60°C), except any mixture having components with flash points of 200°F (93.3°C) or higher, the volume of which makes up 99% or more of the total volume of the mixture; and class III, with flash point at or above 140°F (60°C). Class III liquids are divided into two subclasses: class IIIA, with flash point at or above 140°F (60°C) and below 200°F (93.3°C), except any mixture having components with flash points of 200°F (93.3°C) or higher, the volume of which makes up 99% or more of the total volume of the mixture; and class IIIB, with flash point at or above 200°F (93.3°C).

Oxidation. Oxidation is a reaction in which a substance combines with oxygen or some other oxidizer.

Oxide Pox. Dermatitis caused by contact with oxides under poor personal hygienic conditions.

Oxidizer. The DOT defines an oxidizer or oxidizing material as a substance that yields oxygen readily to stimulate the combustion (oxidation) of organic matter. Chlorate (ClO), permanganate (MnO), and nitrate (NO) compounds are examples of oxidizers. Note that they all contain oxygen (O).

Oxidizing Agent. A chemical or substance that brings about an oxidation reaction. The agent may (1) provide the oxygen to the substance being oxidized (in which case the agent has to be oxygen or contain oxygen), or (2) receive electrons being transferred from the substance undergoing oxidation. (Chlorine is a good oxidizing agent for electron-transfer purposes, even though it contains no oxygen.) See Reducing Agent.

Palpitation. Irregular, rapid heartbeat.

Parathesia. A sensation of prickling, tingling, or creeping on the skin that has no objective cause.

Particulate. Small, separate pieces of an airborne material. Dusts, fumes, smokes, mists, and fogs are examples. Generally, anything that is not a fiber and has an aspect ratio of 3 to 1.

Partition Coefficient. See Coefficient of Water/Oil Distribution.

PCB. Polychlorinated biphenyl. Pathogenic and teratogenic compound used as a heat-transfer medium. It accumulates in tissue. PCBs are hazardous. Their handling is regulated by law. See 40 CFR Part 761.

PEL. Permissible exposure limit. Established by OSHA. This may be expressed as a time-weighted average (TWA) limit or as a ceiling exposure limit that legally must never be exceeded instantaneously even if the TWA exposure limit is not violated. OSHA PELs have the force of law. Note that ACGIH TLVs and NIOSH RELs are recommended exposure limits that may or may not be enacted into law by OSHA.

Pensky-Martens Closed Cup or Closed Tester. See PMCC.

Percent Volatile. Percent volatile by volume. The percentage of a liquid or solid (by volume) that evaporates at an ambient temperature of 70°F (20°C) unless some other temperature is stated. E.g., gasoline and paint thinner (mineral spirits) are 100% volatile; their individual evaporation rates vary, but over a period of time each evaporates completely. This physical characteristic reflects the potential for releasing harmful vapor into the air.

Permissible Exposure Limit. See PEL.

Personal Hygiene. Precautionary measures taken to maintain good health when exposed to potentially harmful materials. This includes keeping hands, other parts of the body, work clothing, and equipment free of a material's residue, as well as not eating, drinking, applying makeup, or using toilet facilities where it is in use.

Personal Protective Equipment. See PPE.

pH. A scale 0 to 14 that represents the acidity or alkalinity of an aqueous solution. Pure water has a pH of 7. Substances in an aqueous solution ionize to various extents giving different concentrations of H and OH ions. The strongest acids have an excess of H ions and a pH of 1 to 3 (HCl, pH=1). The strongest bases have an excess of OH ions and a pH of 11 to 13 (NaOH, pH = 12). The pH scale is logarithmic and the intervals are exponential, so the progression of values represents far greater concentrations than one would suspect, i.e., pH of 3–10,000 to 1 ratio of H ions, while a pH of 4–1000 to 1, pH of 5–100 to 1.

Phlegm. Thick mucous from the respiratory passage.

Photophobia. Intolerance to light.

Physical Hazard. A substance for which there is valid evidence that it is a combustible liquid, compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive), or water reactive.

Physical State. The condition of a material; i.e., solid, liquid, or gas, at room temperature.

PIN. Product identification number. A four-digit number, prefaced by UN or NA, used in Canada under the Transportation of Dangerous Goods Regulation for use by emergency personnel to identify a material in the event of an accident.

PMCC. Pinsky-Martens closed cup. One of several types of apparatus for determining flash points. The Pinsky-Martens closed tester (ASTM D93-79) is used for liquids that have a viscosity of 45 SUS (Saybolt universal seconds) or more at 100°F (38°C), a flash point of 200°F (93.6°C) or higher, contain suspended solids, or form surface films.

Pneumoconiosis. A respiratory tract and lung condition caused by inhalation and retention of irritant mineral or metallic particles. An X ray can detect changes, which include fibrosis, emphysema.

Pneumonia. Inflammatory lung disease caused by microorganisms, virus, and chemical or physical irritants.

PNS. Peripheral nervous system effects.

Poison, Class A. A DOT term for an extremely dangerous poison such as a poisonous gas or liquid of such a nature that a very small amount of the gas or vapor of the liquid mixed with air is dangerous to life. E.g., phosgene, cyanogen, hydrocyanic acid, and nitrogen peroxide.

Poison, Class B. A DOT term for liquid, solid, paste, or semisolid substances other than class A poisons or irritating materials known or presumed on the basis of animal tests to be so toxic to man as to afford a hazard to health during transportation.

Poison Control Center. Provides medical information on a 24-hour basis for accidents involving ingestion of potentially poisonous materials. Call your area's largest hospital to find the one nearest to you.

Polymerization. A chemical reaction in which one or more small molecules combine to form larger molecules. A *hazardous polymerization* is such a reaction that takes place at a rate that releases large amounts of energy that can cause fires or explosions or burst containers. Materials that can polymerize usually contain inhibitors that can delay the reactions.

Pour Point. The temperature at which a liquid either congeals or flows.

PO_x. Oxides of phosphorus.

ppb. Parts per billion, by volume.

PPE. Personal protective equipment. Devices or clothing worn to help insulate a worker from direct exposure to hazardous materials. Examples include gloves and respirators.

ppm. Parts per million. "Parts of vapor or gas per million parts of contaminated air by volume at 25°C and 1 torr pressure" (ACGIH).

$\text{ppm} = (\text{mg}/\text{m}^3) \times 24.45 \div \text{MW}$.

ppt. Parts per trillion, by volume.

Precordial. In front of the heart, stomach.

Product Identification Number. See PIN.

Prostration. Physical exhaustion, incapacitation.

Proteinuria. Presence of protein in the urine.

psia. Pounds per square inch absolute.

Psychotropic, PSY. Acting on the mind.

PUL. Pulmonary systems effects. Effects on respiration and respiratory pathology.

Pulmonary Edema. Fluid in the lungs.

Purge. To clean, clear, or empty of material.

Pyrolysis. A chemical decomposition or breaking apart of molecules produced by heating.

Pyrophoric. Describes materials that ignite spontaneously in air below 130°F (54°C). Occasionally friction ignites them.

RBC. Red blood cell effects.

RCRA. Resource Conservation and Recovery Act, PL 94-580. Found at 40 CFR 240-271. EPA has jurisdiction. Enacted November 21, 1976, and amended since. RCRA's major emphasis is the control of hazardous waste disposal. It controls all solid-waste disposal and encourages recycling and alternative energy sources. In 1984 the USA generated 265 million tons of hazardous waste.

RCRA Hazardous Waste. A material designated by RCRA as hazardous waste and assigned a number to be used in record keeping and reporting compliance (e.g., D003, F001, U169).

Reactive Material. A chemical substance or mixture that vigorously polymerizes, decomposes, condenses, or becomes self-reactive due to shock, pressure, or temperature. Includes materials or mixtures that fall within any of these categories: (1) explosive material -- a substance or mixture that causes sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden adverse conditions; (2) organic peroxide -- an organic compound that contains the bivalent -O-O- structure, which can be considered a structural derivative of hydrogen peroxide, in which one or both of the hydrogen atoms has been replaced by an organic radical; (3) pressure-generating material -- a substance or mixture that may spontaneously polymerize with an increase in pressure unless protected by the addition of an inhibitor or by refrigeration or other thermal control; decompose to release gas in its container, or comprise the contents of a self-pressurized container; (4) water-reactive material -- a substance or mixture that reacts with water to release heat or a flammable, toxic gas.

Reactivity. Describes a substance's tendency to undergo chemical reaction either by itself or with other materials with the release of energy. Undesirable effects such as pressure buildup; temperature increase; or formation of noxious, toxic, or corrosive byproducts may occur because of the substance's reactivity to heating, burning, direct contact with other materials, or other conditions in use or in storage. A solid waste that exhibits a "characteristic of reactivity," as defined by RCRA, may be regulated (by the EPA) as a hazardous waste and assigned the number D003.

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Reagent. Substance used in a chemical reaction to produce another substance or to detect its composition.

Recommended Exposure Limit. See REL.

Reducing Agent. In a reduction reaction (which always occurs simultaneously with an oxidation reaction), the reducing agent is the chemical or substance that (1) combines with oxygen or (2) loses electrons to the reaction. See Oxidation; Oxidizing Agent.

REL. The NIOSH REL (Recommended Exposure Limit) is the highest allowable airborne concentration that is not expected to injure a worker. It may be expressed as a ceiling limit or as a time-weighted average (TWA), usually for 10-hour work shifts.

Reportable Quantity. See RQ.

Reproductive Health Hazard/Toxin. Any agent that has a harmful effect on the adult male or female reproductive system or the developing fetus or child. Such hazards affect people in several ways, including loss of sexual drive, mental disorders, impotence, infertility, sterility, mutagenic effects on germ cells, teratogenic effects on the fetus, and transplacental carcinogenesis.

Resource Conservation and Recovery Act. See RCRA.

Respirator. Any of a variety of devices that limit the inhalation of toxic materials. They range from disposable dust masks to self-contained breathing apparatus. All have specific uses and limitations. Their use is covered by OSHA, 29CFR1910.134. See SCBA, Chemical Cartridge Respirator.

Respiratory System. The breathing system, including the lungs and air passages (trachea or windpipe, larynx, mouth, and nose), as well as the associated system of nerves and circulatory supply.

Routes of Entry. To do bodily damage, a material must contact the body. The method of bodily contact is called the route of entry. The routes of entry are (1) absorption (eye or skin contact); (2) ingestion; and (3) inhalation.

RQ. Reportable Quantity. The amount of a material that when spilled must be reported to the DOT (Section 311 of the Clean Water Act).

RTECS. *Registry of Toxic Effects of Chemical Substances*, published by NIOSH. Presents basic toxicity data on thousands of materials. Its objective is to identify "all known toxic substances" and to reference the original studies.

Saint Andrew's Cross. X. Used in packaging for transport; means harmful - stow away from foodstuffs. (IMO, Material Class 6.1, Group III).

SARA. Superfund Amendments and Reauthorization Act. Signed into law October 17, 1986. Title III of SARA is known as the Emergency Planning and Community Right-to-Know Act of 1986. It is a revision

and extension of CERCLA. SARA is intended to encourage and support local and state emergency planning efforts. It provides citizens and local governments with information about potential chemical hazards in their communities. SARA calls for facilities that store hazardous materials to provide officials and citizens with data on the types (flammables, corrosives, etc.); amounts on hand (daily, yearly); and their specific locations. Facilities are to prepare and submit inventory lists, MSDSs, and tier 1 and 2 inventory forms. The disaster in Bhopal, India, in 1987 added impetus to the passage of this law.

SCBA/SCBAF. Self-contained breathing apparatus. Breathing apparatus with full facepiece and an independent supply of air or oxygen.

SCC. See SETA, SETAFLASH Closed Tester.

Sclerae. The tough, white, fibrous covering of the eyeball.

Select Carcinogen. See Carcinogen.

Sensitization. A state of immuneresponse reaction in which further exposure elicits an immune or allergic response. A person previously exposed to a certain material is more sensitive when further exposed to it.

Sensitizer. A material that on first exposure causes little or no reaction in man or test animals, but which on repeated exposure may cause a marked response not necessarily limited to the contact site. Skin sensitization is the most common form. Respiratory sensitization to a few chemicals is also known to occur.

SETA, SETAFLASH Closed Tester. Used to measure flash points in liquids in the 32 to 230°F range (ASTM D 3278-82).

Siderosis. Pneumoconiosis caused by the inhalation of iron particles. Also, tissue pigmentation caused by contact with iron.

Silicosis. A condition of massive fibrosis of the lungs causing shortness of breath because of prolonged inhalation of silica dusts.

Skin. Notation indicating possible significant contribution to overall exposure to a material by way of absorption through the skin, mucous membranes, and eyes by direct or airborne contact.

SKN. Skin effects; e.g., erythema, rash, sensitization of skin.

Slurry. A pourable mixture of solid and liquid.

Smoke. Dry particles and droplets (usually carbon or soot) generated by incomplete combustion of an organic material combined with and suspended in the gases from combustion.

Soln. Solution. A uniformly dispersed mixture. Solutions are composed of a solvent (water or another fluid, for example) and a dissolved substance, called the solute.

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Solubility in Water. A term expressing the percentage of a material (by weight) that will dissolve in water at ambient temperature. Solubility information is useful in determining cleanup methods for spills and fire-extinguishing methods for a material. Solubility is expressed as *negligible*, less than 0.1 percent; *slight*, 0.1 to 1.0 percent; *moderate*, 1 to 10 percent; *appreciable*, more than 10 percent; *complete*, soluble in all proportions. Best units of measure are g/l. Reported values can be converted: $\text{mg/l} + 1000 = \text{g/l}$; $\text{g/100ml} \times 10 = \text{g/l}$; $\text{g/100cc} \times 10 = \text{g/l}$; $\text{g/gH}_2\text{O} \times 1000 = \text{g/l}$.

Solution. See Soln.

Solvent. A material that can dissolve (reduce to molecular form) other materials to form a uniform mixture. Water can be a solvent.

Soot. Fine particles, usually black, formed by combustion (complete or incomplete) and consisting chiefly of carbon. Soot gives smoke its color.

SO_x. Oxides of sulfur where x equals the number of oxygen atoms.

Spasm. An involuntary, convulsive muscular contraction.

SPCC. Spill Prevention, Control, and Countermeasure plan.

Specific Gravity. Describes the density (or heaviness) of a material and is expressed as a ratio of the density (*d*) of a substance (at °F/°C) to a specified reference substance (at °F/°C). Water (*d* = 1g/cc, at 39°F/4°C) is the density reference for solids and liquids while air (*d* = 1.29 g/l, at 32°F/0°C and 760 mm) is the density reference for gases. Essentially, specific gravity for solids and liquids numerically equals density. For example, a solid or liquid with a 1.2 g/cc density has a specific gravity of 1.2 ($1.2 + 1.0 = 1.2$). However, the specific gravity for gases does not equal density since air has a density of 1.29 g/l. For example hydrogen has a density of 0.089 g/l with a specific gravity of 0.069, ($0.089\text{g/l} + 1.29\text{g/l}$). Specific gravity is an important fire suppression and spill cleanup consideration because most (not all) flammable liquids have less than a 1.0 specific gravity and, if insoluble, float on water.

Stability. An expression of the ability of a material to remain unchanged. For MSDS purposes a material is stable if it remains in the same form under expected and reasonable conditions of storage or use. Conditions such as temperatures above 150°F or shock from being dropped that may cause instability (dangerous change) are stated on the MSDS. See Unstable.

STEL. Short-term exposure limit; ACGIH terminology. See TLV-STEL.

STEV. Short-term exposure value. See TLV.

Stomatitis. Inflammation of the mucous membrane of the mouth.

Stupor. Partial or nearly complete loss of consciousness.

Subcutaneous. Beneath the skin.

Sublime. To change from the solid to the vapor phase without passing through the liquid phase. Dry ice exhibits sublimation.

Subpart Z. See Z List.

Superfund Amendments and Reauthorization Act. See SARA, CERCLA.

SUS. Saybolt Universal Seconds. A unit measure of viscosity determined by the number of seconds required for an oil heated to 130°F (lighter oils) and 210°F (heavier oils) to flow through a standard orifice and fill a 60-ml flask.

Synergy. An interaction of materials to give a result different from either material alone. For example, both smoking and exposure to asbestos can cause lung disease; however, if an individual smokes and is exposed simultaneously to asbestos, the danger of lung disease increases dramatically.

Synonyms. Alternative names by which a material may be known.

SYS. Systemic effects. Effects on the entire body.

Tachycardia. Excessively rapid heartbeat, with a pulse rate above 100.

Tachypnea. Increased rate of respiration.

Tag Closed Cup. See TCC or TCT.

Tag Open Cup. See TOC.

Tag Open Tester. An open-tank tester for liquids with low flash points. See TCC or TCT.

Target Organ Effects. Chemically caused effects from exposure to a material on specifically listed organs and systems such as the liver, kidneys, nervous system, lungs, skin, and eyes.

TCC or TCT. Tag (Tagliabue) closed cup or Tag closed tester. One of several types of apparatus for determining flash points. The Tag closed tester, per ASTM D56-79, is intended for testing liquids with a viscosity of less than 45 SUS at 100°F (38°C) and a flash point below 200°F (93.4°C). Liquids should not have suspended solids or form surface films.

TC_{Lo}. Toxic concentration low. The lowest concentration of a substance in air to which humans or animals have been exposed for any given period of time that has produced any toxic effect in humans or produced a tumorigenic or reproductive effect in animals or humans.

TDL. Toxic dose level.

TD_{Lo}. The lowest dose of a substance introduced by any route other than inhalation over any given period of time and reported to produce any toxic effect in humans or to produce tumorigenic or reproductive effects in animals or humans.

Temp. Temperature.

TER; Teratogen. An agent or material causing physical defects in a developing embryo.

TFX. Toxic effects. Used to introduce the principle organ system affected as reported or its pathology. See RTECS.

Threshold Limit Value. See TLV.

Time-Weighted Average. See TLV-TWA.

Tinnitus. A ringing sound in the ears.

TLm. Median tolerance limit. Designates the concentration of a toxic material at which 50% of the test organisms, usually aquatic organisms, survive.

TL90, for example, may be required by a conservation authority where pollution must be limited to protect the fish.

TLV. Threshold limit value. A term used by ACGIH to express the airborne concentration of a material to which nearly all workers can be exposed day after day without adverse effects. "Workers" means healthy individuals. The young, old, ill, or naturally susceptible will have lower tolerances and need to take additional precautions. ACGIH expresses TLVs in three ways: TLV-TWA, the allowable time-weighted average concentration for a normal 8-hour workday or 40-hour week; TLV-STEL, the short-term exposure limit or maximum concentration for a continuous exposure period of 15 minutes (with a maximum of four such periods per day, with at least 60 minutes between exposure periods, and provided that the daily TLV-TWA is not exceeded); ceiling (C) the concentration that should not be exceeded at any time.

TLV-Ceiling Limit. TLV-C. The ceiling exposure limit or the concentration that should not be exceeded even instantaneously. The ACGIH publishes a book annually that explains and lists TLVs in *TLVs: Threshold Limit Values for Chemical Substances in the Work Environment Adopted by ACGIH*. Copies are available from ACGIH (q.v.).

TLV-Skin. See Skin.

TOC. Tag open-cup test method.

torr. mm Hg pressure.

Toxic. Describes a material's ability to injure biological tissue. Having (1) an LD50 of 50 to 500 mg/kg when administered orally to albino rats weighing 200 to 300 g each; (2) an LD50 of 200 to 1000 mg/kg when administered by continuous contact for 24 hours to the bare skin of albino rabbits weighing 2 to 3 kg each; or (3) an LC50 of 200 to 2000 ppm (gas or vapor) or 2 to 20 mg/l (mist, fume, or dust) when administered by continuous inhalation for 1 hour to albino rats weighing 200 to 300 g each. See Acute Toxicity.

Toxicology. The study of the nature, effects, and detection of poisons in living organisms. Also, substances that are otherwise harmless but prove toxic under particular conditions. The basic assumption of

toxicology is that there is a relationship (amount), the concentration at the affected, resulting effects.

Toxic Substance. Any chemical or material has evidence of an acute or chronic health hazard as is listed in the *NIOSH Registry of Toxic Effects of Chemical Substances (RTECS)*, provided that the substance causes harm at any dose level; causes cancer or reproductive effects in animals at any dose level; has a median lethal dose (LD50) of less than 500 mg per kg of body weight when administered orally to rats; has a median LD50 of less than 1000 mg per kg of body weight when administered by continuous contact to the bare skin of albino rabbits; or has a median lethal concentration (LC50) in air of less than 2000 ppm by volume of gas or vapor, or less than 20 mg per l of mist, fume, or dust when administered to albino rats.

Toxic Substances Control Act. See TSCA.

TPQ Threshold Planning Quantity. Per 40 CFR 302. The amount of material at a facility that requires emergency planning and notification per CERCLA.

Trade Name. A name given to a product by the manufacturer or supplier. It is usually not the chemical name, and the same or similar products can be marketed under different trade names by different companies.

Trade Secret. Confidential information (formula, process, device, or compilation of data) that gives the owner an advantage over competitors. Manufacturers may choose to withhold data of a proprietary nature from an MSDS. Typically this would be the ingredients of a formulated product. OSHA permits this provided that (1) the trade secret claim can be substantiated, (2) the MSDS indicates that data is being withheld, and (3) the properties and health effects are included. State laws vary on this practice; some states require a trade secret registration number to be assigned to a material. There are procedures to obtain limited trade secret disclosure in emergency situations.

TSCA. Toxic Substances Control Act. Public Law PL 94-469. Found in 40 CFR 700-799. EPA has jurisdiction. Effective January 1, 1977. Controls the exposure to and use of raw industrial chemicals not subject to other laws. Chemicals are to be evaluated prior to use and can be controlled based on risk. The act provides for a listing of all chemicals that are to be evaluated prior to manufacture or use in the US. (Call the EPA, Industry Assistance Office, [202] 554-1404.)

TWA. Time-weighted average. See TLV-TWA.

TXDS. Qualifying toxic dose.

UEL. See Upper Explosive Limit, Upper Flammable Limit.

UFL. See Upper Explosive Limit, Upper Flammable Limit.

UN Number. See DOT Identification Numbers; PI

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Unstable. Tending toward decomposition or other unwanted chemical change during *normal* handling or storage. An unstable chemical in its pure state, or as commonly produced or transported, polymerizes vigorously, decomposes, condenses, or becomes self-reactive under conditions of shock, pressure, or temperature. See *Stability*. See *Stability, Reactive*.

Upper Explosive Limit, Upper Flammable Limit. UEL, UFL. The highest concentration of a material in air that produces an explosion in fire or ignites when it contacts an ignition source (high heat, electric arc, spark, or flame). A higher concentration of the material in a smaller percentage of concentration of air may be too rich to be ignited. See *Flammable Limits*.

Urticaria. Nettle rash; hives; elevated, itching, white patches.

UV. Ultraviolet (light).

Vapor. The gaseous state of a material suspended in air that would be a liquid or solid under ordinary conditions.

Vapor Density. The weight of a vapor or gas compared to the weight of an equal volume of air; an expression of the density of the vapor or gas calculated as the ratio of the molecular weight of the gas to the average molecular weight of air, which is 29. The $\text{mw of gas}/29 = \text{vapor density}$. Materials lighter than air have vapor densities of less than 1.0. Materials heavier than air have vapor densities greater than 1.0. All vapors and gases mix with air, but the lighter materials tend to rise and dissipate (unless confined). Heavier vapors and gases are likely to concentrate in low or enclosed places (along or under floors; in sumps, sewers, manholes, trenches, and ditches) creating fire, explosion, or health hazards. A factor in still, enclosed air.

Vapor Pressure. The pressure exerted by a saturated vapor above its own liquid in a closed container. Vapor pressures reported on MSDSs are in millimeters of mercury (mm Hg) at 68°F (20°C), unless stated otherwise. Three facts are important to remember: 1) vapor pressure of a substance at 100°F (38°C) is always higher than the vapor pressure of the substance at 68°F (20°C), 2) vapor pressures reported on MSDSs in mm Hg are usually very low pressures: 760 mm Hg is equivalent to 14.7 lb/in², and 3) the lower the boiling point of a substance, the higher its vapor pressure. Vapor pressures are useful (with evaporation rates) in learning how quickly a material becomes airborne within the workplace and thus how quickly a worker is exposed to it.

Vertigo. A feeling of revolving in space; dizziness, giddiness.

Viscosity. Measurement of the flow properties of a material expressed as its resistance to flow. Unit of measurement and temperature are included.

VOC. Volatile organic components. Used in coatings and paint because they evaporate very rapidly. Regulated by EPA per Clean Water Act.

Volatility. Measure of a material's tendency to vaporize or evaporate at ambient routine conditions.

VP. See *Vapor Pressure*.

Water Reactive. Describes a material that reacts with water to release a flammable gas or to present a health hazard.

WBC. White blood cell effects.

Wilson's RISK Scale. See page 20.

Zinc Fume Fever, ZFF. Caused by inhalation of zinc oxide fume and characterized by flulike symptoms: a metallic taste in the mouth, coughing, weakness, fatigue, muscular pain, and nausea, followed by fever and chills. Symptoms occur 4 to 12 hours after exposure.

Z List. OSHA's Toxic and Hazardous Substances Tables Z-1, Z-2, and Z-3 of air contaminants, found in 29 CFR 1910.1000. These tables record PELs, TWAs, and ceiling concentrations for the materials listed. Any material found on these tables is considered hazardous.